

**400V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

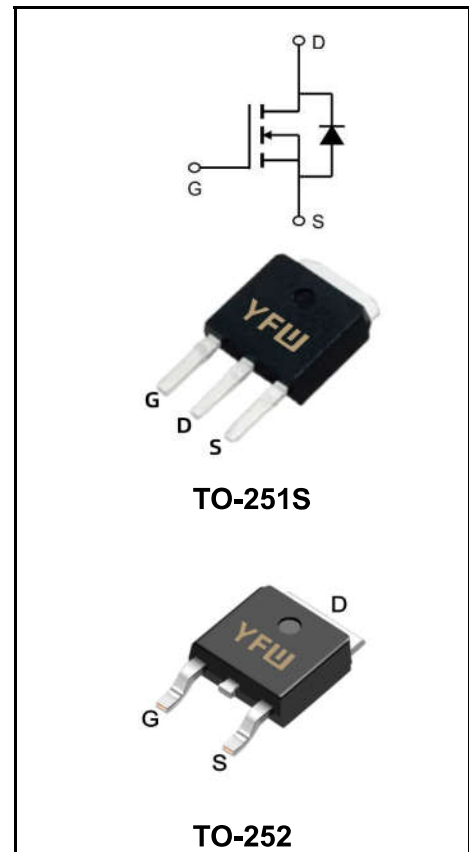
<b>I<sub>D</sub></b>	5A
<b>V<sub>DSS</sub></b>	400V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	<1.2 Ω ( <b>Type:1 Ω</b> )

**Features**

- ◆Fast Switching
- ◆Low ON Resistance
- ◆Low Gate Charge
- ◆100% Single Pulse avalanche energy Test
- ◆LeadfreeincomplywithEURoHS2011/65/EUdirectives

**Mechanical Data**

- ◆Case: Molded plastic
- ◆Mounting Position: Any
- ◆Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆Solder bath temperature275°C maximum,10s per JESD22-106



**Maximum Ratings At Tc=25°C Unless Otherwise Specified**

Characteristics	Symbols	Value	Units
		251/252	
Drain-Source Voltage	<b>V<sub>DS</sub></b>	400	<b>V</b>
Gate-Source Voltage	<b>V<sub>GS</sub></b>	±30	<b>V</b>
Continue Drain Current	<b>I<sub>D</sub></b>	5	<b>A</b>
		- Continuous(Tc=100°C)	
Pulsed Drain Current (Note1)	<b>I<sub>DM</sub></b>	20	<b>A</b>
Power Dissipation	<b>P<sub>D</sub></b>	62	<b>W</b>
		-Derate above 25°C	
Single Pulse Avalanche Energy (Note2)	<b>E<sub>AS</sub></b>	180	<b>mJ</b>
Avalanche Current (Note 1)	<b>I<sub>AR</sub></b>	5	<b>A</b>
Repetitive Avalanche Energy (Note 1)	<b>E<sub>AR</sub></b>	8.5	<b>mJ</b>
Operating Temperature Range	<b>T<sub>J</sub></b>	150	<b>°C</b>
Storage Temperature Range	<b>T<sub>STG</sub></b>	-55 to +150	<b>°C</b>
Thermal Resistance, Junction to Case	<b>R<sub>θJC</sub></b>	2.5	<b>°C/W</b>
Thermal Resistance, Junction to Ambient	<b>R<sub>θJA</sub></b>	82	<b>°C/W</b>

**Maximum Ratings At Tc=25°C Unless Otherwise Specified**

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	$BV_{DSS}$	400	-	-	<b>V</b>
Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ (Referenced to 25°C)	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	-	0.65	-	<b>V/°C</b>
Drain-Source Leakage Current	$V_{DS} = 400\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	-	-	1	<b>uA</b>
	$V_{DS} = 400\text{ V}, T_C = 125^\circ\text{C}$		-	-	10	<b>uA</b>
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	-	-	$\pm 100$	<b>nA</b>
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	2	-	4	<b>V</b>
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$	$R_{DS(on)}$	-	1	1.2	<b>Ω</b>
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 2.5\text{ A}$	$g_{fs}$	-	4.6	-	<b>S</b>
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V},$ $f = 1\text{ MHz}$	$C_{iss}$	-	462	-	<b>pF</b>
Output Capacitance		$C_{oss}$	-	71	-	
Reverse Transfer Capacitance		$C_{rss}$	-	5.1	-	
Turn-on Delay Time	$I_D = 5\text{ A}, V_{DD} = 200\text{ V},$ $R_G = 10\ \Omega$ (Note3,4)	$t_d(ON)$	-	14	-	<b>nS</b>
Rise Time		$t_r$	-	20	-	
Turn-Off Delay Time		$t_d(OFF)$	-	31	-	
Fall Time		$t_f$	-	12	-	
Total Gate Charge	$I_D = 5\text{ A}, V_{DD} = 320\text{ V},$ $V_{GS} = 10\text{ V}$ (Note3,4)	$Q_G$	-	12.6	-	<b>nC</b>
Gate to Source Charge		$Q_{GS}$	-	4.1	-	
Gate to Drain Charge		$Q_{GD}$	-	4	-	

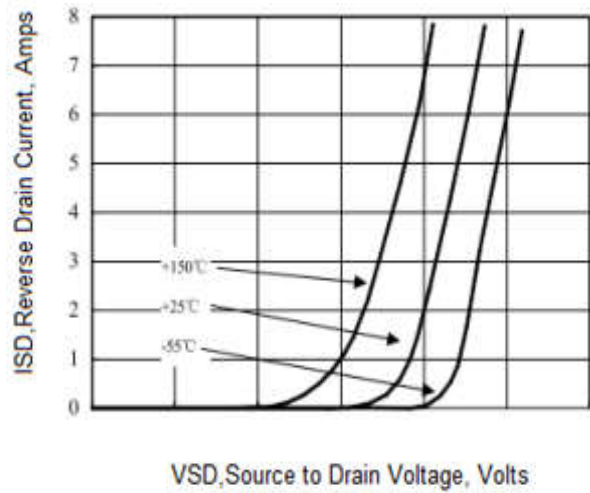
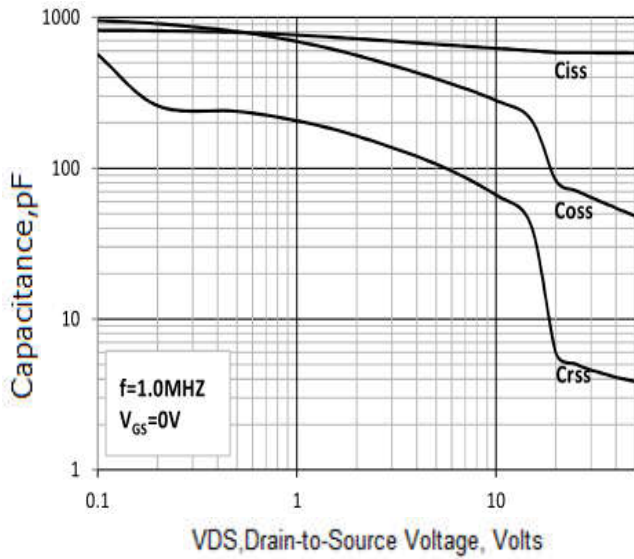
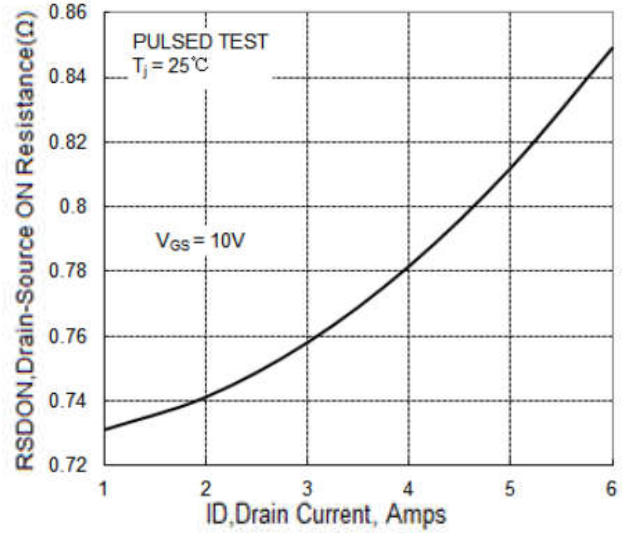
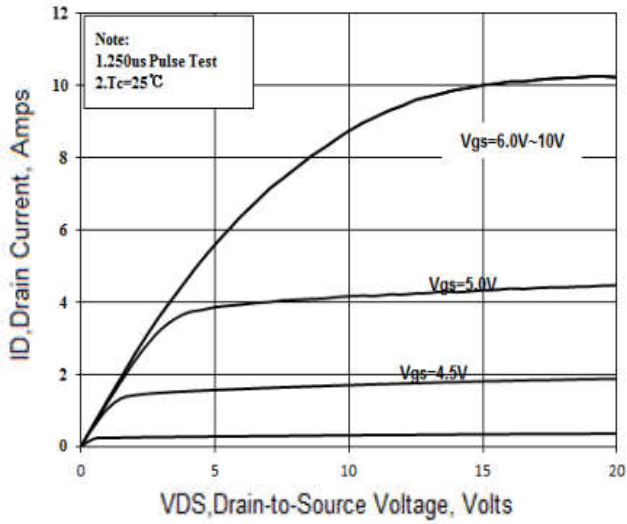
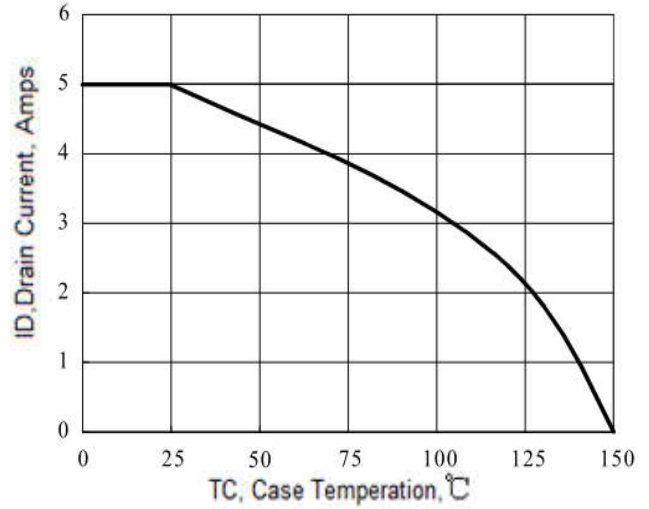
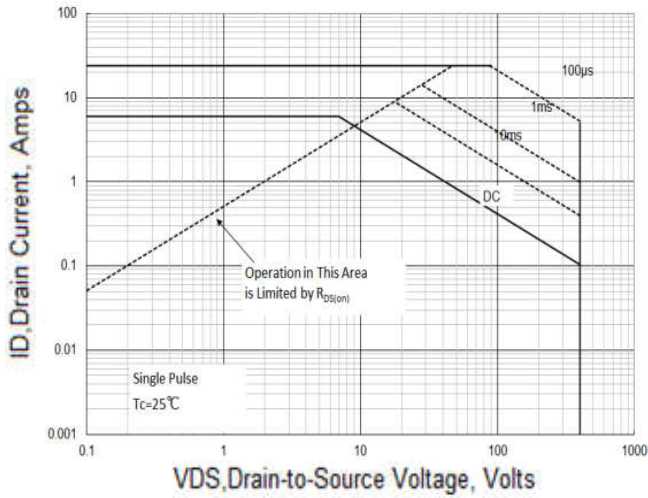
**Source-Drain Diode Characteristics At Ta=25°C Unless Otherwise Specified**

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximun Body-Diode Continuous Current		$I_S$	-	-	5	<b>A</b>
Maximun Body-Diode Pulsed Current		$I_{SM}$	-	-	24	<b>A</b>
Drain-Source Diode Forward Voltage	$I_{SD} = 5\text{ A}$	$V_{SD}$	-	-	1.5	<b>V</b>
Reverse Recovery Time	$I_{SD} = 5\text{ A}, V_{GS} = 0\text{ V},$ $di_F / dt = 100\text{ A}/\mu\text{s}$	$t_{rr}$	-	240	-	<b>nS</b>
Reverse Recovery Charge		$Q_{rr}$	-	1.2	-	<b>uC</b>

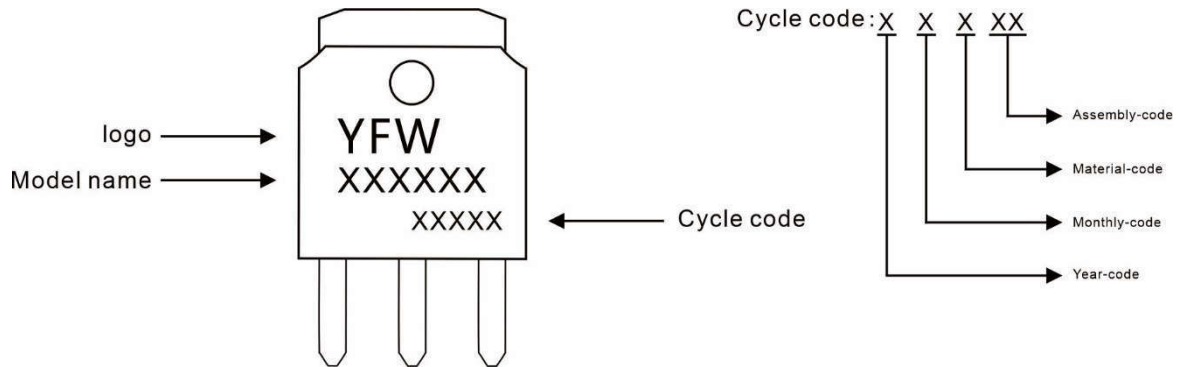
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2.  $I_{AS} = 5\text{ A}, V_{DD} = 50\text{ V}, L = 15\text{ mH}, R_G = 25\ \Omega$ , starting  $T_J = 25^\circ\text{C}$ .
3. ulse test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Essentially Independent of Operating Temperature.

Ratings and Characteristic Curves



**Marking Diagram**



**Ordering information**

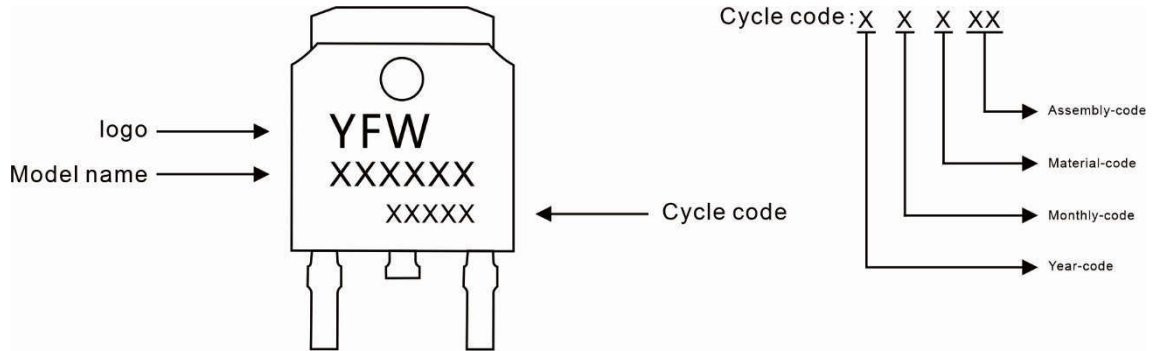
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N40AMJ	TO-251S	0.011oz(0.32g)	80pcs/tube	4000pcs/box 24000pcs/Carton

**Package Dimensions**

**TO-251S**

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.1	2.5	0.083	0.098
A1	6.3	6.9	0.248	0.271
A2	0.9	1.1	0.035	0.043
A3	TYP0.5		TYP0.019	
b	0.6	0.8	0.024	0.031
c	0.4	0.5	0.015	0.020
D	5.3	5.5	0.209	0.217
D2	3.65	4.05	0.144	0.159
E	5.8	6.4	0.228	0.252
E2	0.9	1.4	0.035	0.055
e	TYP2.29		TYP0.090	
e1	TYP4.58		TYP0.180	
L	3.7	4.3	0.146	0.169

**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N40AD	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

**Package Dimensions**

**TO-252**

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	1.20	1.60	0.047	0.063
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.40	5.70	0.213	0.224
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	10.00	11.00	0.393	0.433
L1	2.70	3.10	0.106	0.122
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059

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